

Scientific news from the  
Miami Beach ACS meeting  
Candidates in ACS fall election:  
Their views and backgrounds Page 58

SEPTEMBER 25, 1989

CHEMICAL ENGINEERING

# NEWS

## Drug Approval

Pressure is on to  
speed up process  
Page 9

## News of the Week

■ **Prospects are bright for Western chemical firms in the U.S.S.R. and East Europe in the 1990s, study says.** Page 6

■ **Du Pont economist forecasts that chemical production will grow more slowly in 1990, rising just 2.5% over 1989.** Page 7

■ **At Australian conference, representatives of world's major chemical industries pledge to work closely with governments to secure global, verifiable chemical weapons treaty.** Page 7

■ **Chemical Abstracts looks toward adding 3-D capability to the its Registry File.** Page 7

■ **Rhône-Poulenc will buy the specialty chemicals unit of U.K. company RTZ Corp. and GAF's surfactants operations.** Page 8

■ **Union Carbide system for making flexible polyurethane foam requires no CFC blowing agent.** Page 8

Cover: Photo by Rick Brady/Uniphoto  
Picture Agency

Letters 4

### Concentrates

Business 14

Government 29

Science/Technology 32

### The Departments

Software/Database Update 46

Meeting Briefs 52

Books 54

ACS News 56

New Products 82

Newscrips 100

## Business

**Massachusetts-based Cabot Corp.** retrenches in effort to improve profitability; polyethylene output and prices in down cycle; plastic composites industry performance levels off in 1989. Page 21

## Government

**Effective risk communication difficult**, prone to public's misconceptions, says National Research Council panel; making of synthetic heroin leads to death of one chemist, imprisonment of another. Page 30

## Science/Technology

**From the ACS meeting in Miami Beach:** ring-opening polymerization method expands thermoplastics technology; modified membranes for methanol oxidation use implanted silver; lead iodide crystals grow differently in space; new techniques for stabilizing geotextiles developed; methylating reagent is stable at room temperature; simulated membrane reactor combines reactions, separation; TVA program tackles environmental concerns; and new catalytic route to commercially useful  $\alpha$ -olefins. New nitrogen technology spurs market development. Page 35

## Education

**More from Miami Beach:** improved precollege science education aim of partnerships between scientists from industry and universities and high school teachers. Page 49

## ACS Election

**Candidates for 1990 president-elect**, directors-at-large, and directors for regions II and IV give views on ACS programs. Page 58

## Awards

**ACS award winners:** Golden, Grasselli, Gray, Hammer, Heathcock, Hoffman, Holm, Horning. Page 75



## News Focus

**FDA is moving to shorten its drug approval process in an effort to get drugs for treating life-threatening illnesses to market faster.** Page 9

## Chemical & Engineering News

1155—16th St., N.W., Washington, D.C. 20036

Editor: Michael Heylin

Assistant Managing Editors: David M. Kiefer, James H. Krieger, Janice R. Long, Donald J. Soisson, William J. Storck. News Editor: Wilbert C. Lepkowski

Staff Editor: Ernest L. Carpenter

Senior Editors: New York: Earl V. Anderson, Stephen C. Stinson; Chicago: Joseph Haggin; Washington: Doron Dagani, Lois R. Ember, Bette Hileman, Rebecca L. Rawls, Pamela S. Zurer

Associate Editors: Stuart A. Borman, Mairin B. Brennan, Ann Marie Menting, Richard J. Seltzer. Service Departments Editor: Dolores Miner. Editing Services: Anne Riesberg (Head), Arlene Goldberg-Gist (Editorial Assistant), Patricia Oates (Administrative Assistant)

News Bureaus: Northeast News Bureau: (201) 906-8300 Marc S. Reich (Associate Editor), Ann M. Thayer (Assistant Editor), Rachel Eskenazi (Administrative Assistant). Chicago: (312) 256-4143 Ward Worthy (Head), Houston: (713) 973-8161 Bruce F. Greek (Head), Susan J. Ainsworth, (Associate Editor). Washington: (202) 872-4495 David J. Hanson (Head). West Coast: (415) 653-3630 Rudy M. Baum (Head). Foreign Bureau: London: (01) 540-0414 Dermot A. O'Sullivan (Head), Patricia L. Layman (Associate Editor)

Graphics and Production: Leroy Corcoran (Manager), Alan Kahan (Art Director), Barbara Fryer (Production/Art Director), Linda Mattingly (Staff Artist), Diane Kelly (Costing).

Business Manager: Arthur Poulos

Circulation Development: Claud K. Robinson

ADVISORY BOARD: Dexter F. Baker, Jacqueline K. Barton, George M. Bodner, Will D. Carpenter, Ernest H. Drew, Harry G. Drickamer, A. Nicholas Filippello, Ethan C. Galloway, Adam Heller, Christopher T. Hill, Kendall N. Houk, C. Bradley Moore, Koji Nakanishi, George B. Rathmann, Robert M. Simon, William P. Slichter, Peter H. Spitz, Barry M. Trost

Published by

AMERICAN CHEMICAL SOCIETY

(202) 872-4600; TDD (202) 872-8733

John K. Crum, Executive Director

Robert H. Marks, Director, Publications Division

PUBLISHING BOARD: Jean'ne M. Shreeve (Chairman); Board of Directors Chairman: Ernest L. Eliel; President: Clayton F. Callis; William P. Jencks; Gary J. Long; John H. Nelson; and Louis D. Quin

© Copyright 1989, American Chemical Society

**Subscription & Member Record Service:** Send all new and renewal subscriptions with payments to: Controller, ACS, P.O. Box 28597, Central Station, Washington, D.C. 20005. Correspondence and telephone calls for changes of address, claims for missing issues, subscription service, status of records and accounts should be directed to: Manager, Member & Subscriber Services, ACS, P.O. Box 3337, Columbus, Ohio 43210; (800) 333-9511 or (614) 447-3776.

For changes of address, include both old and new addresses with ZIP code numbers and mailing label from a recent issue. Allow four weeks for change to become effective. Claims for missing numbers will not be allowed if loss was due to failure of notice of change of address to be received in the time specified; if claim is dated (a) North America: more than 90 days beyond issue date, (b) all other foreign: more than one year beyond issue date; or if the reason given is "missing from files."

**Subscription Rates 1989.** Printed editions: nonmembers U.S. 1 yr. \$55, 2 yr. \$99, outside U.S. 1 yr. \$86, 2 yr. \$161. Air freight rates available on request. Rates above do not apply to nonmember subscribers in Japan, who must enter subscription orders with Maruzen Co. Ltd., 3-10 Nihonbashi 2-chome, Chuo-ku, Tokyo 103, Japan. Tel: (03) 272-7211. Single copies: Current \$8.00. Rates for back issues and volumes are available from Microforms & Back Issues Office, ACS, 1155—16th St., N.W., Washington, D.C. 20036. Back and current issues available on microfilm and microfiche. Rates on request from Microform Program, ACS.

Chemical & Engineering News (ISSN 0009-2347) is published weekly except for the last week in December by the American Chemical Society at 1155—16th St., N.W., Washington, D.C. 20036. Second-class postage paid at Washington, D.C., and additional mailing offices. POSTMASTER: Send address changes to Chemical & Engineering News, Membership & Subscription Services, P.O. Box 3337, Columbus, Ohio 43210. ACS assumes no responsibility for the statements and opinions advanced by the contributors to its publications.

Advertising Management  
CENTCOM LTD.

(For list of offices see page 99)

## LETTERS

### Fewer chemistry students

SIR: In response to Jeff Nissen's letter (C&EN, Aug. 14, page 3), the primary reason fewer and fewer students are studying chemistry is unquestionably the miserable employment prospects enjoyed by chemists. For example, I received my B.S. degree in chemistry from Case Western Reserve University in August 1987, and have been looking for an entry-level position ever since. My grade-point average was 2.76; admittedly not head of the class, but not miserably either. I could, of course, have gone to my pick of schools for graduate study, but there is not one employer who will hire me (with the exception of one laboratory technician position I was offered for \$15,000 a year). And I personally know several other chemists who, like myself, either were utterly unable to find a job or could get a job only as a lab technician at a large local manufacturer (lab techs there start at \$20,000 to \$24,000—significantly higher than the salaries mentioned for many of the chemist positions for which I have been interviewed).

I am currently a provisional graduate student in chemical engineering at the University of Cincinnati because it would be very irrational of me to pursue a graduate degree in a field that offers such miserable employment prospects.

My point here is not to plead for sympathy, but rather to point out that as long as employment prospects for chemists are as bad as they are, fewer and fewer students will major in chemistry. What else do you expect?

Frank Eric Espohl  
Cincinnati, Ohio

### Financial support from NSF

SIR: All chemists at the National Science Foundation are pleased by the well-deserved accolades—such as the one by David Henderson of Trinity College—for Bassam Shakhshiri's leadership in revitalizing science education (C&EN, July 31, page 2).

However, I would like to correct Henderson's erroneous assertion that the REU (Research Experiences for Undergraduates) Program "has gone almost exclusively to universities." In the 45 new site programs in chemistry initiated between 1987 and 1989, 15 have gone to undergraduate institutions. The review panels selecting award recipients have drawn members from both research universities and liberal arts colleges, and rankings have been on the basis of merit, not quotas. Doctoral insti-

tutions have enjoyed a 13% success ratio in chemistry, and undergraduate schools have had a 12% rate. Interestingly, doctorate-granting departments account for 64% of applications though they account for only 33% of ACS-accredited departments at the bachelor's level—reinforcing an old NSF adage that overall success closely parallels application pressure.

Chemistry funding for Research at Undergraduate Institutions (RUI) has grown from less than \$1.2 million in 1984 to an average annual investment of \$3 million today, despite less than inflationary growth in the division's budget. Total financial support for undergraduate research as an integral part of undergraduate education is up fivefold since 1981, and is still growing. Although Henderson is surely correct that the exemplary record of our nation's liberal arts colleges in producing future scientists warrants strong, continued NSF support, perhaps the financial support already available from NSF is more substantial than he realizes.

Kenneth G. Hancock

Deputy Director, Chemistry Division  
National Science Foundation  
Washington, D.C.

### Nuclear power

SIR: Harvey Wasserman's letter (C&EN, June 5, page 2) regarding the death of nuclear power as a viable energy source is but another example of the frustrations facing our nation. In the same issue of C&EN, a business concentrate (page 8) states that in 1988 nuclear power plants produced one third or more of the total electric power in 11 countries, up from eight countries in 1987, and that France received the greatest percentage, 70%. It also states that in the U.S., nuclear accounted for about 20% of the electric power produced. With our open society and the need for short-term profitability, we should be concerned about our inability to plan for the long-term future.

John Campbell's new book, "Collapse of an Industry—Nuclear Power and Contradictions of U.S. Policy" (Cornell

### Correction

• July 24: The cover identification was omitted. The photo, furnished by Du Pont, shows a worker testing a CFC alternative for cleaning electronic circuit boards.



## Put Our Heads On Your Foam Problem.

The antifoam experts at Dow Corning will find the answers.

And recommend the right antifoam agent from our broad line. Whether your problem is with high or low pH. Or with high temperature. Or for food-related uses. For both aqueous and non-aqueous systems.

Remember, our antifoams are concentrated to go a long way, and last a long time.

For samples or answers from the antifoam experts...

Call  
**1-800**  
**FOAM**  
**FREE**

Or write: Dow Corning Corporation,  
Dept. A-7016, P.O. Box 7604,  
Mt. Prospect, IL 60056-7604.

**DOW CORNING®**



©1988 Dow Corning Corporation.

CIRCLE 11 ON READER SERVICE CARD

26 September 25, 1989 C&EN

## Business

### Plastic composites use slows in 1989

The performance of the U.S. plastic composites industry has leveled off in 1989, according to figures compiled by the Composites Institute of the Society of the Plastics Industry. Shipments for the year are projected to increase only 0.3% over 1988 levels. Total shipments are estimated to reach slightly more than 2.66 billion lb for the year. This represents a significant change in the overall growth of the composites market as compared with 1988. In 1988, shipments increased overall nearly 5% over the previous year.

Polymer-based composite materials include reinforced thermoplastic and thermoset resins, reinforcements, and fillers used in a wide variety of applications. The transportation industry is the largest consumer of composites, representing 26% of the total market, yet shipments to the transportation industry will increase only 1.3% to 704 million lb in 1989. It is estimated that, later this year, commercial production by General Motors of a composite-based vehicle will add another 75 million lb per year to transportation industry figures.

The second largest composites market, at almost 19%, is the construction industry. This market remains steady with annual shipments of 495 million lb in 1988 and 1989, reflecting in part the poor performance in housing markets. The marine industry is another large market that accounted for 16% or 433 million lb per year in 1989, a 4.3% drop from 1988 levels. Shipments to the marine industry are showing

the largest decrease of any of the nine market sectors. This is in contrast to 1988 when shipments were up nearly 10%. However, the drop in shipments to the marine industry is not being viewed as a trend and shipments are expected to pick up again in 1990.

A few markets, such as the aerospace and military, appliance and business equipment, and electrical and electronics markets, are looking stronger in 1989. Together these markets account for about 16% of the total market share, or about 429 million lb in 1989. Composite materials, because of their lightweight and high-strength characteristics, are finding increased application in armored military vehicles, ships, and commercial and military aircraft. Shipments to the aerospace and military market are showing the largest gain of 4.3%, reaching 41.1 million lb in 1989.

The appliance and business equipment, and electrical and electronics markets show the next largest gains of 2.5% and 2.2%, respectively. The electronics market uses 235 million lb in fabricating three-dimensional circuit boards that allow for the miniaturization of electronic components and in new chip encapsulation techniques. The corrosion-resistant equipment and consumer products markets are showing growth levels around 1.0% in 1989, to 351 million lb and 171 million lb, respectively. Composites use in corrosion resistance materials are expected to increase.

Ann Thayer

### Aerospace uses of composites show most growth

| Millions of lb                | 1989 <sup>a</sup> | 1988          | 1987          | Change<br>1988-89 |
|-------------------------------|-------------------|---------------|---------------|-------------------|
| Aerospace and military        | 41.1              | 39.4          | 36.4          | 4.3%              |
| Appliances and business       | 153.3             | 149.6         | 140.5         | 2.5               |
| Construction                  | 495.4             | 495.4         | 506.0         | 0                 |
| Consumer products             | 170.9             | 168.9         | 166.5         | 1.2               |
| Corrosion-resistant equipment | 350.8             | 348.7         | 329.0         | 1.0               |
| Electrical and electronics    | 234.8             | 229.8         | 214.0         | 2.2               |
| Marine                        | 432.8             | 452.2         | 412.6         | -4.3              |
| Transportation                | 703.6             | 694.8         | 656.0         | 1.3               |
| Other                         | 82.2              | 79.5          | 75.3          | 3.4               |
| <b>TOTAL</b>                  | <b>2664.9</b>     | <b>2658.3</b> | <b>2536.3</b> | <b>0.3%</b>       |

<sup>a</sup> Based on six-month estimates and projections for the remainder of the year.  
Source: Composites Institute, Society of the Plastics Industry